

Remarks

For the Claims:

The applicant submitted claims 1-12, of which claims 1, 4, and 9 are independent claims. This Office Action rejects claims 1, 4-5, 8-10, and 12, and objects to claims 2-3, 6-7, and 11 as being dependent upon rejected base claims. The applicant amends claims 1-12, i.e., all claims, and adds a new claim 13. The applicant respectfully requests reconsideration.

The applicant amends claims 1-12, i.e., all claims, to correct certain grammatical and structural errors.

The applicant has also amended independent claim 4 to broaden the scope of the claim and to more clearly set forth that which the applicant regards as his invention. This amendment to claim 4 has necessitated further amendments to claims 5 and 8, the addition of new claim 13 dependent from independent claim 4, and a rerouting of the dependency of claim 5 from claim 4 to claim 13. These amendments add no new subject matter.

This Office Action rejects claims 1, 4-5, 8-10, and 12 under 35 U.S.C. 102(b) as being anticipated by Otterman et al., U.S. Patent No. 5,505,180 (hereinafter Otterman).

Regarding independent claims 1, 4, and 9, this Office Action asserts that Otterman discloses a linear predictive system having those characteristics claimed in applicant's claim 1, a DC-DC converter comprising all the basic elements claimed by applicant's independent claim 4, and a method of operating a DC-DC converter containing all the basic activities claimed by applicant's independent claim 9.

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What has not been taken into account, however, is that there is a fundamental structural difference between Otterman and the present invention as defined in each of applicant's claims. In Otterman, the predictive function is performed in feedforward circuitry operating in parallel to a portion of a first (and only) feedback loop. In the present invention, as recited in each of the independent claims, the predictive function is performed in a second feedback loop, and not a feedforward loop as taught by Otterman. In other words, Otterman teaches a single feedback loop operated in conjunction with a feedforward loop, whereas the present invention teaches two feedback loops. The systems of Otterman and the present invention are inherently different in structure. Otterman does not teach what is claimed by applicant's independent claims 1, 4, and 9.

The applicant further amends independent claims 1, 4, and 9 to more clearly indicate the presence of the two feedback loops. These amendments to independent claims 1, 4, and 9 are fully supported by the specification. The presence of the first feedback loop is supported by paragraph [0016], which reads in part

...A standard loop includes a combiner 101...having a positive input receiving a reference voltage VREF and a negative input receiving an output signal VOUT....

Similarly, the presence of the second feedback loop is supported by paragraph [0021], which reads in part:

The predictor block 109 provides a faster feedback loop to anticipate the desired duty cycle and to modify the duty cycle towards the correct value faster than the slow digital compensation block 103....

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The applicant believes independent claims 1, 4, and 9 to be allowable as amended over Otterman under 35 U.S.C. 102(b). The applicant respectfully requests reconsideration of independent claims 1, 4, and 9.

Nor would it be obvious to modify Otterman to more closely resemble the invention defined in each of applicant's claims. Otterman teaches an electromechanical device having interrelated mechanical factors. Otterman teaches the use of manifold vacuum as a parameter in the Otterman's single feedback loop. Otterman also teaches the use of engine RPM as a parameter in the feedforward loop (which is actually a part of the single feedback loop). The introduction of engine RPM takes place after the introduction of manifold vacuum. However, those skilled in the art will appreciate that a change in engine RPM typically causes a change in manifold vacuum. That is, a change in manifold vacuum takes place after a change in engine RPM. If both parameters were introduced in separate feedback loops, having independent mechanically affected delay times, there would exist a serious risk of a mechanical oscillation (surging). This is highly undesirable and certainly not a modification one skilled in the art would attempt. Therefore, one of ordinary skill in the art would not find it obvious to modify Otterman to use the double feedback loop of the present invention, as this would risk instability in the Otterman system, and make the Otterman system unable to reliably fulfill its function.

Regarding claims 5 and 8, this Office Action asserts that Otterman discloses a multiplier that multiplies a delta signal by a gain factor, as claimed in the applicant's claim 5, and discloses a combiner that subtracts the output signal from a reference signal, as claimed in applicant's claim 8.

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Claims 5 and 8 depend directly from independent claim 4. Inasmuch as the applicant believes independent claim 4 to be allowable as amended for the reasons discussed hereinbefore, the applicant also believes claims 5 and 8 to be allowable as amended by reason of dependency. The applicant respectfully requests reconsideration of claims 5 and 8.

Regarding claims 10 and 12, this Office Action asserts that Otterman discloses multiplying a duty cycle delta by a loop gain factor, as claimed in applicant's claim 10, and discloses subtracting an output signal from a reference signal to produce a feedback error signal, as claimed in applicant's claim 12.

Regarding claims 2-3, 6-7, and 11, this Office Action objects to claims 2-3, 6-7, and 11 as being dependent upon rejected base claims. Claims 2-3, 6-7, and 11 would be rendered allowable if rewritten in independent form including all of the limitations of the rejected base claim and any intervening claims.

Claims 2 and 3 depend directly from independent claim 1. Claims 6 and 7 depend, either directly or indirectly from independent claim 4. Claim 11 depends directly from independent claim 9. Inasmuch as the applicant believes independent claims 1, 4, and 9 to be allowable as amended for the reasons discussed hereinbefore, the applicant also believes claims 2-3, 6-7, and 11 to be allowable as amended by reason of dependency. The applicant respectfully requests reconsideration of claims 2-3, 6-7, and 11.

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Accordingly, this Amendment amends claims 1-12, and adds claim 13. Currently amended claims 1-12 remain in the application and are believed to be allowable.

Applicant believes that the foregoing amendments and remarks are fully responsive to the rejections and/or objections recited in the 30 June 2005 Office Action and that the present application is now in a condition for allowance. Accordingly, reconsideration of the present application is respectfully requested.

Respectfully submitted,



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